

Eastern Great Basin Coordination Center

7-Day Significant Fire Potential Product



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This document outlines Eastern Great Basin Coordination Center's (EGBCC) operational **7-Day Significant Fire Potential Model and Product** as well as the weather monitoring infrastructure designed to support it.

Overview and Purpose

The outcome of the **7 Day Significant Fire Potential Model** is the daily projected significant fire potential for sub-units of Eastern Great Basin called Predictive Services Areas for the next 7 days.

The overall purpose of this product is to identify where and when nationally shared resources will most likely be required for suppression efforts for the next 7 days in order to help regional fire managers make informed resource movement decisions. Uses of this product by local level fire managers include: help determine daily staffing decisions, support severity funding requests, and help make local resource movement decisions. For best use of this product it is important to understand how the product was designed and what it represents. This product is derived by estimating the daily large fire probability for each PSA by assessing the following:

1. Daily probability of occurrence of a new large fire and/or,
2. Daily potential for significant growth on an existing fire.

Significant Fire Event – An event measured by the occurrence of fire(s) that requires mobilization of additional resources from outside the fire event area.

Significant Fire Potential - The likelihood a wild land fire event will require mobilization of additional resources from outside the area in which the fire situation originates.

Weather and Fuels Monitoring Infrastructure

In order to facilitate the assessment of **significant fire potential** with some degree of spatial resolution we have broken up the region into a subset of smaller forecast areas. In addition, we have established a manageable sub-network of “key” weather and NFDRS reporting stations. These Remote Automated Weather Stations (RAWS) will be used for monitoring both weather and fuel conditions in the determination of significant fire potential.

The smaller forecast areas were determined by defining geographic areas with similar climate, topography, fire occurrence and fuel type. These forecast areas are called **Predictive Services Areas (PSAs)**. Key RAWS within each PSA were chosen based on how well they correlated with the other RAWS in the PSA. RAWS whose minimum relative humidities trended up or down well together were used as the key RAWS for that PSA. A map of the PSAs within EGB is included as Appendix A. The list of key RAWS for each PSA is included as part of Appendix B.

Significant Fire Potential Model

Projections of the daily probability of a **Significant Fire Event** for the next 7 days are generated each morning by 1000 MDT during the fire season (May – October) at EGBCC.

Definitions

Significant Fire Event -For the purposes of the model a Significant Fire Event has been defined in terms of the occurrence of a Large Fire. The rationale for this is that the occurrence of a **Large Fire** represents a scenario where outside resources will be needed, costs escalate and regional and national resource managers get involved.

Fire Day – Any day that at least one fire, of any size, was reported to have **started**.

Large Fire – A fire of such size that meets or exceeds the 95th percentile of daily largest fires for all fire days during months and years used in the data set for each PSA.

Large Fire Day – Any day that at least one fire was reported to have started that **eventually became** a Large Fire.

Example:

For **PSA EB01** – The largest fire size on 95% of all **Fire Days** that occurred during the months of July – September for the years 1993-2004 was less than 300 acres. Only 5 percent of all **Fire Days** had a 300 acre or larger fire during the specified time frame. Therefore, a **Large Fire** is defined as 300 acres for this PSA.

This criteria results in a Large Fire size unique to each PSA, ranging from as small as 30 acres in northeast Utah, to 2000 acres in southwest Idaho. Large fire sizes are defined for each PSA as part of Appendix B.

Fuel Dryness Level (DL)

We have chosen to use projected NFDRS fuel moisture values to help predict large fire potential.

Our research has shown that a matrix of the historical NFDRS Energy Release Component for fuel model G (**ERC-G**) versus the 100-hr fuel moisture (**100Hr**) relates relatively well to large fire occurrence. A matrix of these NFDRS components has been developed for each PSA, as measured by the key RAWS. **ERC-G** values run across the top of the matrix and **100Hr** values run down the left column. The numbers within the matrix show how many **Large Fire Days** occurred for each combination of **ERC-G** and **100Hr** during the specified time period. For each combination of **ERC-G** and **100Hr**, the empirical probability of breaking a Large Fire, given an ignition, has been calculated and included as Appendix B. The matrices were created to establish breakpoints of the **ERC-G** and **100Hr** values for use within the model. This range of probabilities has been broken into three groups called **Dryness Levels**, represented as 1 of 3 possible colors defined below.

Dryness Level	Large Fire Potential Description	Ave. % probability of breaking a large fire
Green (Moist)	Indicates a DL which historically has resulted in a very low probability of large fires.	1-3%
Yellow (Dry)	Indicates a transitional dryness situation that will not typically result in large fires unless accompanied by a Significant Weather Trigger.	5-7%
Brown (Very Dry)	Indicates a DL which results in a much higher than normal probability of large fires when accompanied by a Significant Weather Trigger. A low to moderate probability for large fire exits in the absence of a trigger.	12-15%
Red (High Risk)	Indicates an especially high probability of large fires. Occurs when the DL is either brown or yellow and is accompanied with a significant weather trigger. DL will appear red with a symbol designating the specific weather trigger.	20-25%



How the model works:

Raw grid point data from weather models is run through regression equations to generate temperature and relative humidity forecasts for each of the key RAWs for the next 7 days. These forecasts are then used in conjunction with the observed ERC and 100Hr values from the previous afternoon to forecast the daily average ERC-G and 100Hr for each PSA for the next 7 days. The ERC-G and 100Hr are then run through the fuel dryness matrices to create the initial Dryness Level forecast.

After running the model and adjusting the output, the meteorologist will also forecast and add **High Risk Days** to the Dryness Level chart indicating any especially high probability days of breaking a large fire due to **significant weather triggers** such as high winds or dry lightning. Short written weather, fuels and resource discussions are added to the Dryness Level chart to produce the complete **7 Day Significant Fire Potential** product. An example of the product is included as Appendix C.

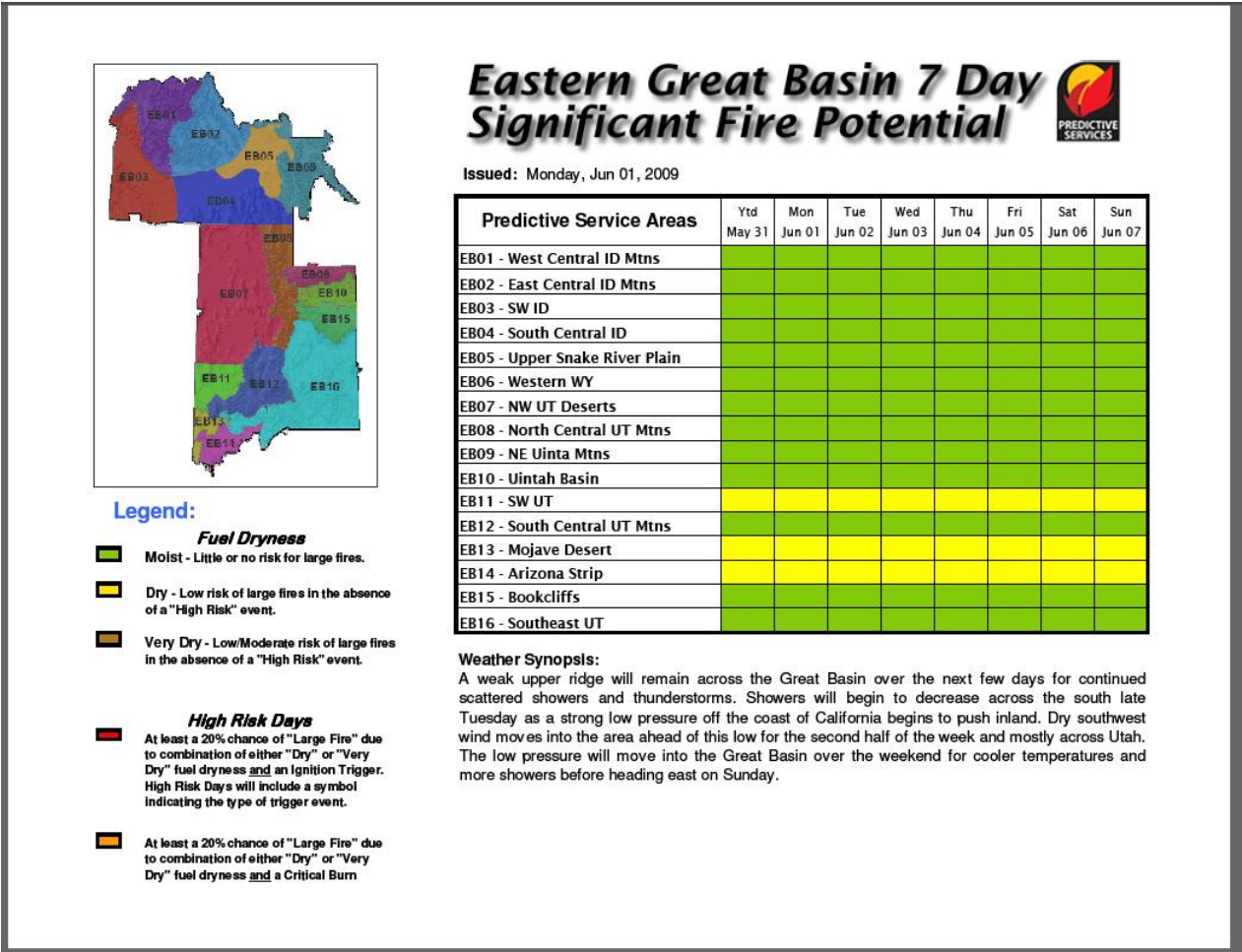
Actual model output forecasts of temperature, relative humidity, ERC-G and 100Hr for each PSA are available on the EGB Predictive Services website.

Within Eastern Great Basin the following **significant weather triggers** are criteria for a **High Risk Day**:

1.  Represents critically dry and windy conditions. While this condition does not start fires, it often produces a favorable environment for new starts or existing fires to become large.
2.  An expected combination of dry fuels and a lightning trigger. This is NOT simply a lightning forecast, but a forecast of lightning conducive to large fire activity.

Summary of “7 Day Significant Fire Potential” Product:

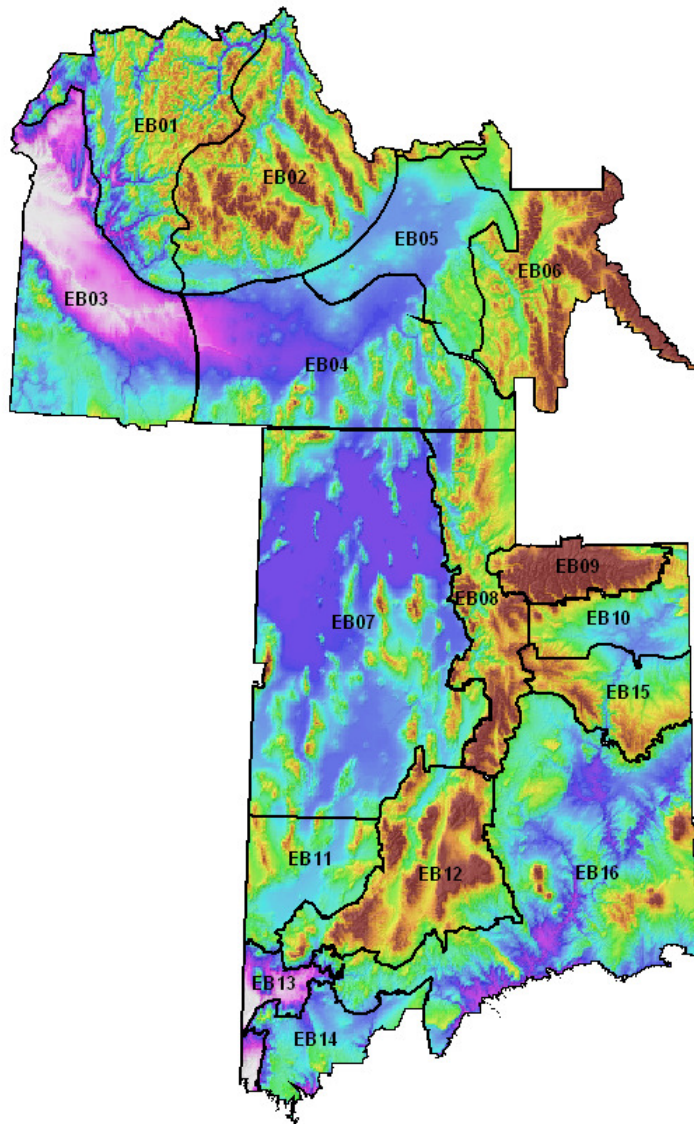
The **7 Day Significant Fire Potential** product is a snapshot of the predicted potential of breaking a **Large Fire** across the Eastern Great Basin for the next 7 days. Smaller geographic areas, called **PSA's** were developed to more precisely forecast Large Fire potential. Dryness Levels are used to represent ranges of probabilities of a Large Fire and are shown on the chart with the DL's displayed as different colors.



Appendices

Predictive Services Areas (PSA):

Eastern Great Basin Geographic Area has been divided into 16 PSA's. These divisions have been made based on similarities within each PSA of the following parameters: fire occurrence, fuel type, elevation, geography, and climate. Below is a topographic map of Eastern Great Basin showing these 16 PSA's.



The following pages describe each PSA including the Fuel Moisture Matrices used to define the respective PSAs dryness levels.

PSA EB01 – West Central Idaho Mountains

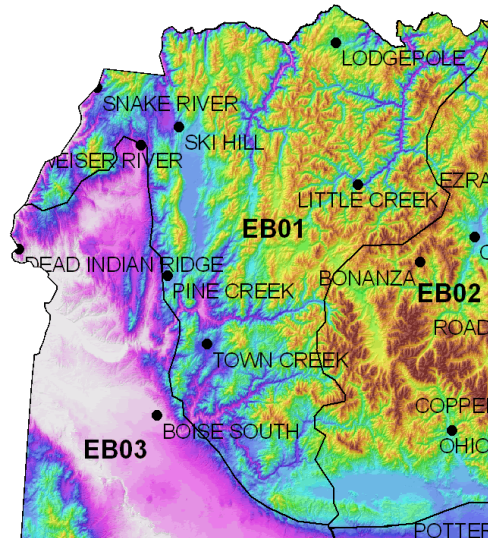
This area represents West Central Idaho Mountains including the Payette, Boise, and part of the Salmon-Challis National Forests.

Key RAWS Name

WIMS ID

Ski Hill	101223
Pine Creek	101222
Town Creek	101708
Little Creek	101805
Logdepole	101044
Snake	101109
Weiser River	101108

Large Fire Size for EB01: **2000 acres**
 Months used for analysis: **July - September**
 Years used for analysis: **1993-2004**



EB01 “Large” Fire Day Matrix:

		ERC G													
		<40	40	45	50	55	60	65	70	75	80	85	90+	POD	PROB
F100	3														
	4											2	2		
	5										5	1	2		
	6							3	6	5	4	1			
	7					1	1	1	1	2					
	8					1	1	1	1						
	9						1	1	2						
	10														
	11	1					1								
	12														

EB01 “All” Fire Day Matrix:

		ERC G													
		<40	40	45	50	55	60	65	70	75	80	85	90+	POD	
F100	3														
	4											3	3		
	5							1	3	12	21	11	4		
	6				2	1	4	20	38	31	35	7			
	7		3	5	4	8	22	42	25	5					
	8		1	2	9	11	26	25	20	4	1				
	9	1	4	6	11	24	26	23	15	3					
	10	8	5	8	17	18	12	9	1						
	11	7	5	9	7	9	6	6							
	12	9	7	12	8	5	8	2							

PSA EB03 – Southwest Idaho and Upper Snake River Plain

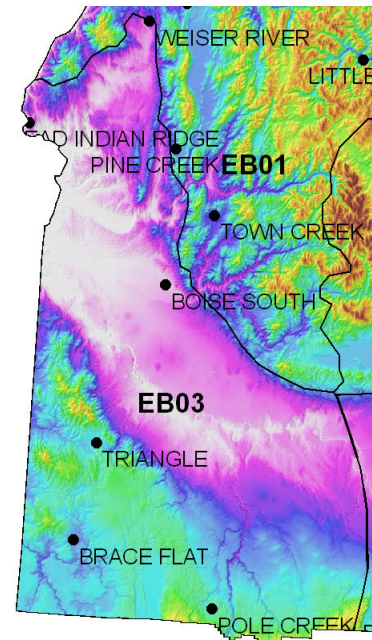
This area represents the Lower Snake River Plain and Owayhee mountains of southwest Idaho including Boise BLM lands.

Key RAWs Name

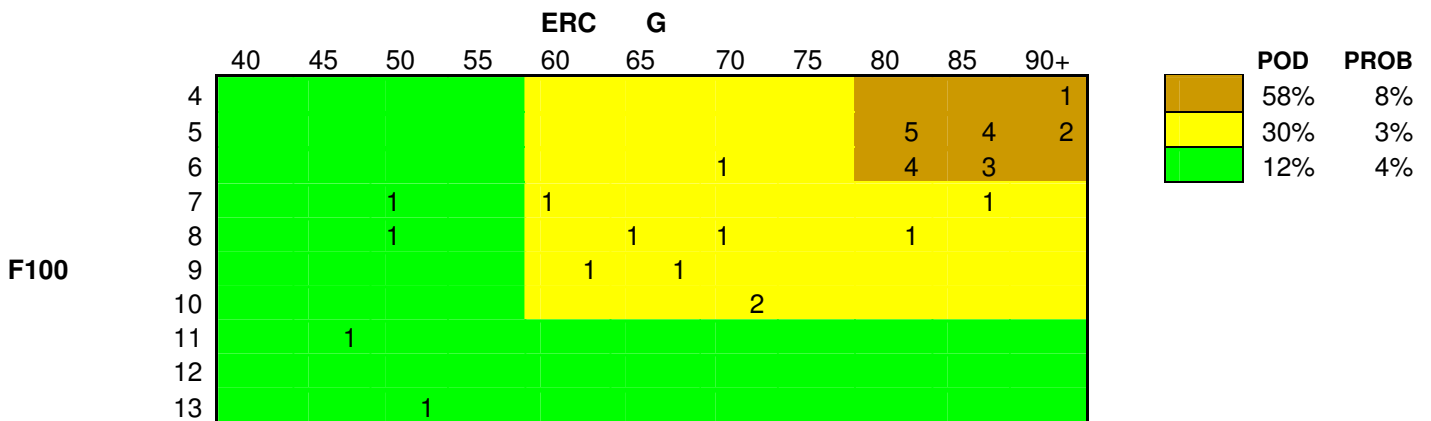
WIMS ID

Dead Indian Ridge	101402
Triangle	103208
Brace Flat	103207
Pole Creek	103210
Boise South	102601

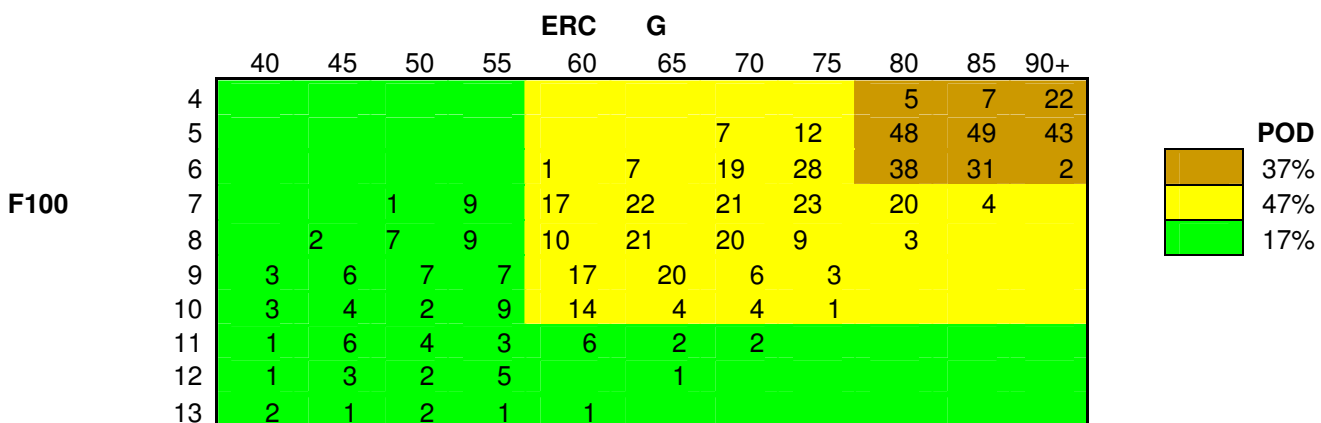
Large Fire Size for EB03: **4300 acres**
 Months used for analysis: **June - September**
 Years used for analysis: **1993-2004**



EB03 “Large” Fire Day Matrix:



EB03 “All” Fire Day Matrix:



PSA EB04 – South Central Idaho

This area represents the South Central Idaho including portions of Twin Falls and Idaho Falls BLMS lands.

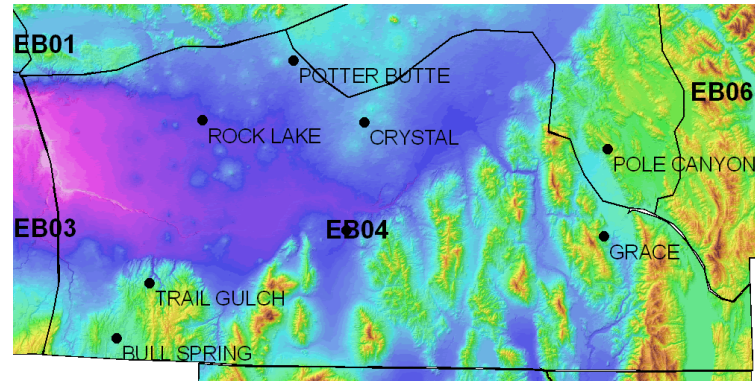
The southern Sawtooth National Forest and eastern portions of the Caribou National Forest are also included in EB04.

Key RAWS Name

Rock Lake
Potter Butte
Crystal
Bull Spring
Grace
Raft River
Trail Gulch

WIMS ID

103403
102907
103703
104006
103902
104104
104004



Large Fire Size for EB04: **4600 acres**

Months used for analysis: **June - September**

Years used for analysis: **1993-2004**

EB04 “Large” Fire Day Matrix:

		ERC				G								
		40	45	50	55	60	65	70	75	80	85	90+	POD	PROB
F100	4									1	1	3	68%	8%
	5							1	1	5	2	2	29%	4%
	6							2	1	9			2%	1%
	7						2	1	2	1				
	8				1			1	2					
	9					1		1						
	10						1							
	11													
	12													
	13													

EB04 “All” Fire Day Matrix:

		ERC				G								
		40	45	50	55	60	65	70	75	80	85	90+	POD	
F100	4									3	13	32	45%	
	5							4	10	42	37	23	38%	
	6					2	7	33	34	87	27	5	18%	
	7				5	6	28	27	39	25	5			
	8	1		6	11	8	23	24	21	4				
	9	3	9	8	14	20	17	18	3	1				
	10	2	3	2	9	9	4	2	1					
	11	2	4	1	8	9	4	1						
	12	1	3	3	5	5	2							
	13		3	5	7	3								

PSA EB05 – Upper Snake River Plain

This area represents the Upper Snake River Plain including Idaho Falls BLM lands.

Key RAWS Name

Pole Canyon
Gas Caves
Arco
Potter Butte

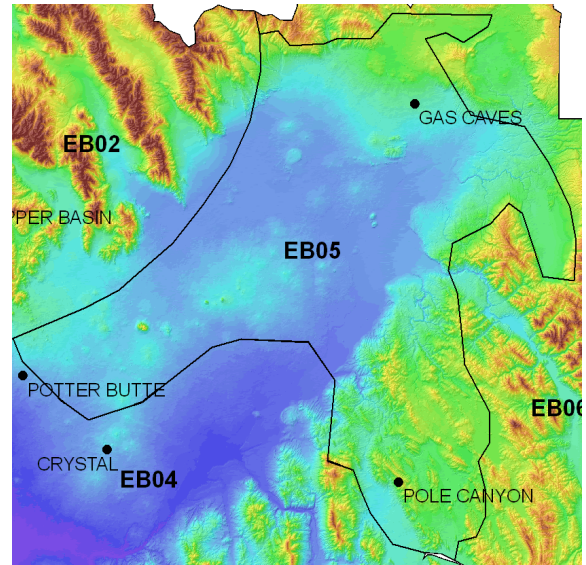
WIMS ID

103903
102106
101905
102907

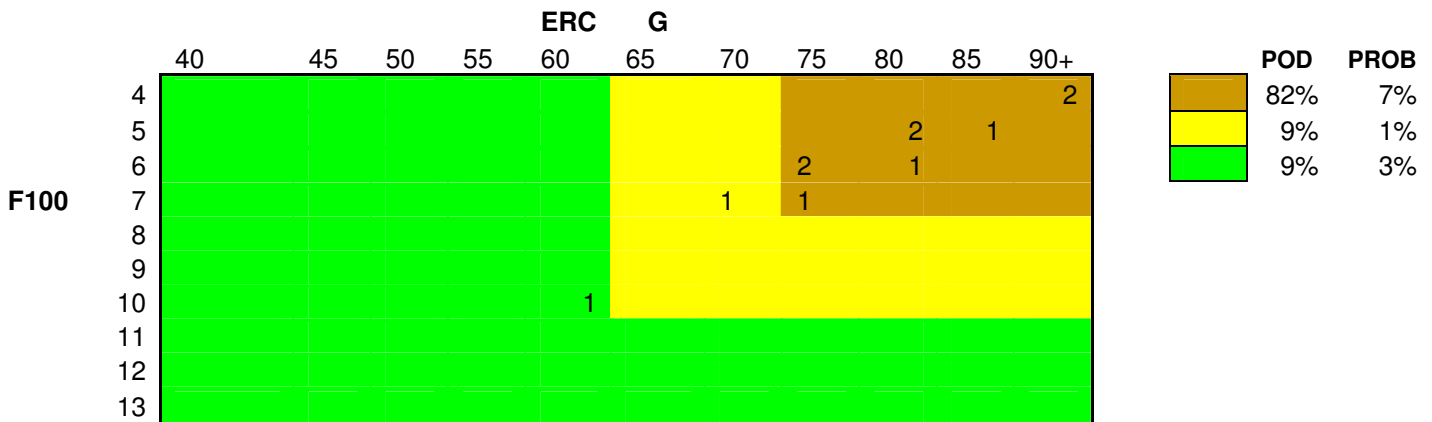
Large Fire Size for EB05: **2700 acres**

Months used for analysis: **June - September**

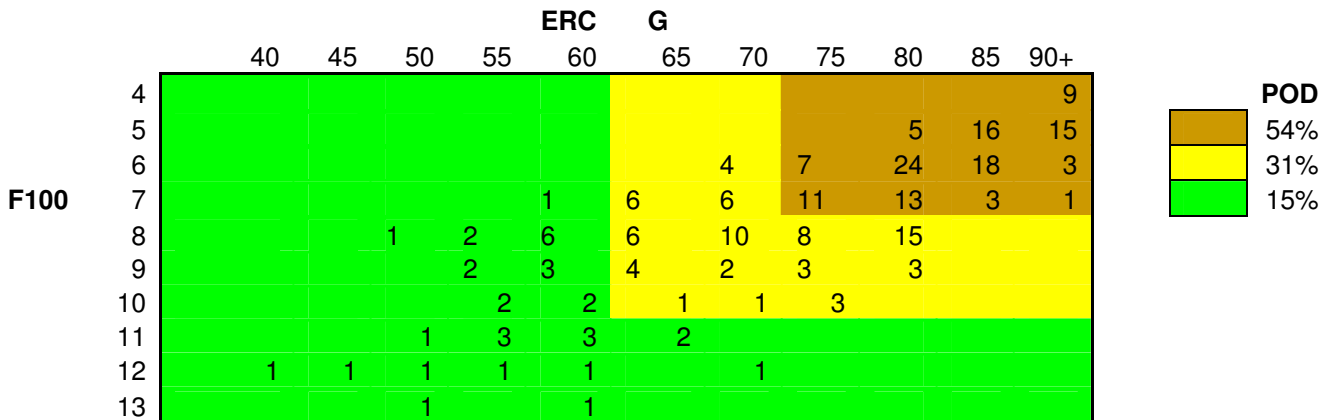
Years used for analysis: **1993-2004**



EB05 “Large” Fire Day Matrix:



EB05 “All” Fire Day Matrix:



PSA EB06 – Western Wyoming and Eastern Idaho Mountains

This area represents the Bridger-Teton NF, Targhee NF, and eastern portions of the Caribou NF.

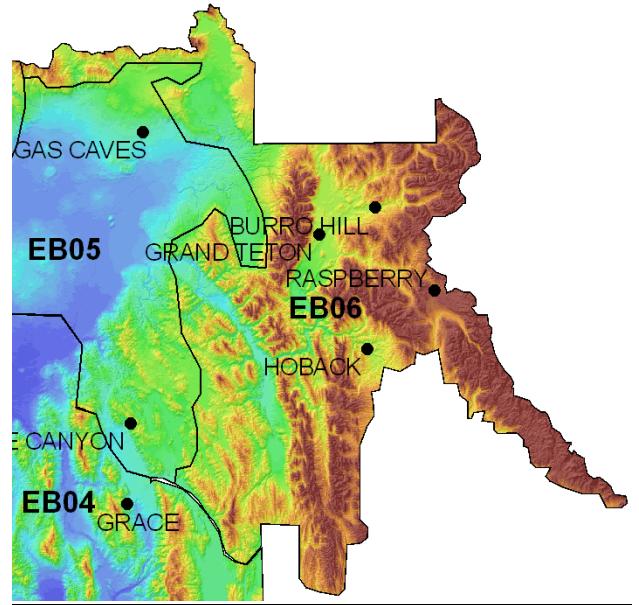
Key RAWS Name

Hoback
Raspberry
Grand Teton
Burro Hill

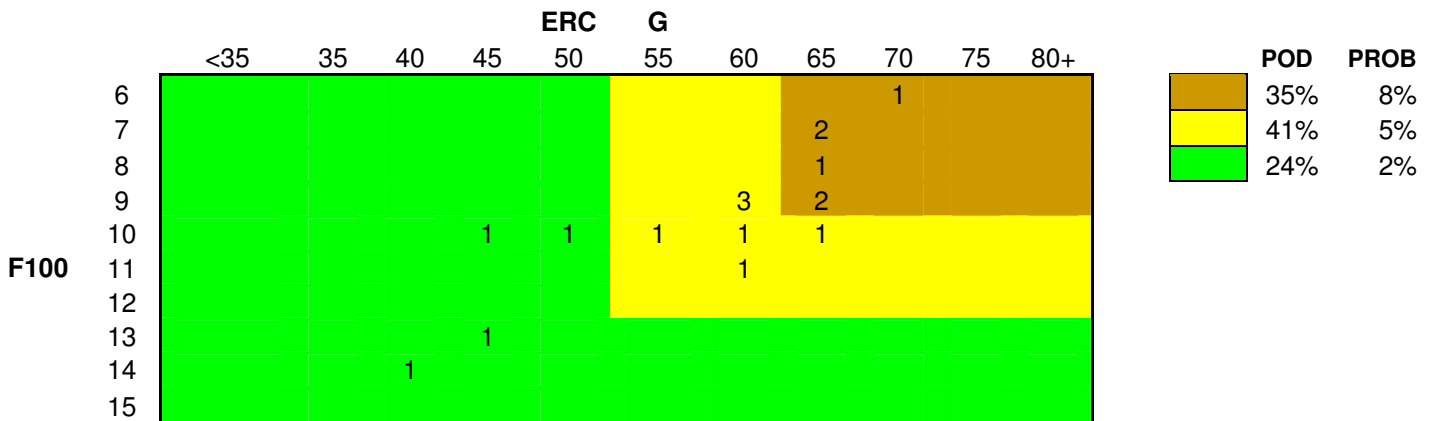
WIMS ID

481302
481307
480708
480707

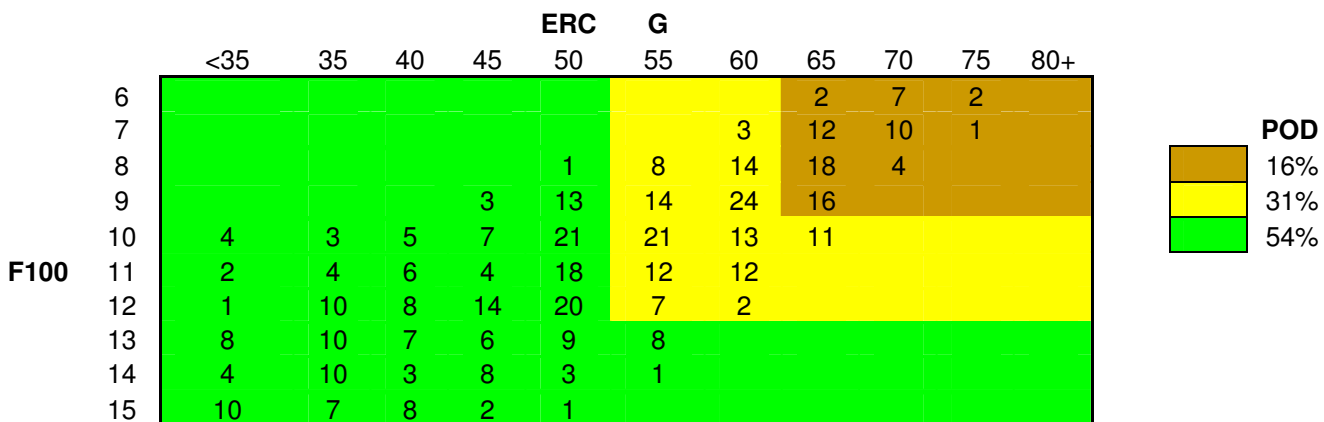
Large Fire Size for EB06: **750 acres**
Months used for analysis: **July - September**
Years used for analysis: **1993-2004**



EB06 “Large” Fire Day Matrix:



EB06 “All” Fire Day Matrix:



PSA EB07 – Western Utah Deserts

This area represents Utah's northwest deserts including West Desert BLM districts as well as some Forest Service Land.

Key RAWs Name

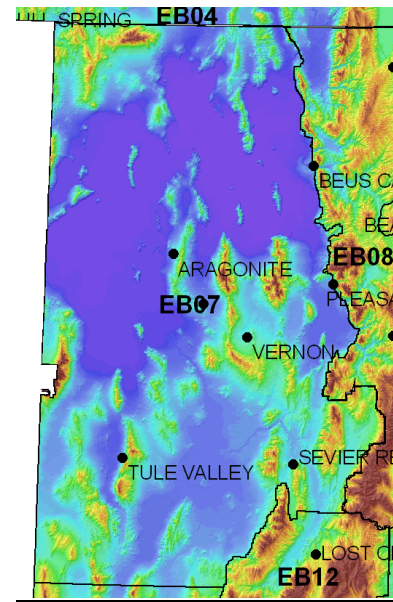
WIMS ID

Cedar Mountain 420901
 Vernon 420908
 Tule Valley 421806
 Aragonite 420911

Large Fire Size for EB07: **2000 acres**

Months used for analysis: **June - September**

Years used for analysis: **2000-2007**



EB07 “Large” Fire Day Matrix:

		ERC G										POD	PROB
		60	65	70	75	80	85	90	95	100	105		
F100	2									1		48%	12%
	3								2	6		43%	8%
	4						1	7	9	3		9%	2%
	5					3	7	7	2	1			
	6				1		3		1				
	7				1								
	8				1	1							
	9					1							
	10												
	11												
	11+												

EB07 “All” Fire Day Matrix:

		ERC										G		POD	
		60	65	70	75	80	85	90	95	100	105	105+			
F100	2							1			8	1		31%	
	3						1	2	9	23	27	11		41%	
	4				1	7	6	19	59	52	22	1		28%	
	5			3	5	16	35	68	46	15	1				
	6			3	7	11	35	60	16	2					
	7	2	3	2	4	21	27	11							
	8	1	2	2	6	11	11	1							
	9	5	2	6	9	21	1								
	10	5	1	3	10	6	1								
	11	4	2	2	5										
	11+	4	4	1	1										

PSA EB08 – North/Central Utah Mountains

This area represents Utah's north/central mountains, including most of the Wasatch-Cache and Uinta NF, and western Manti- La Sal NF, with a small portion of BLM land in far northern Utah.

Key RAWS Name

Rays Valley
Otter Creek
Bues Canyon

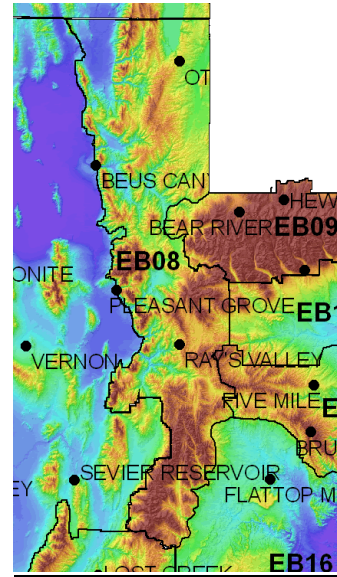
WIMS ID

421103
420912
420403

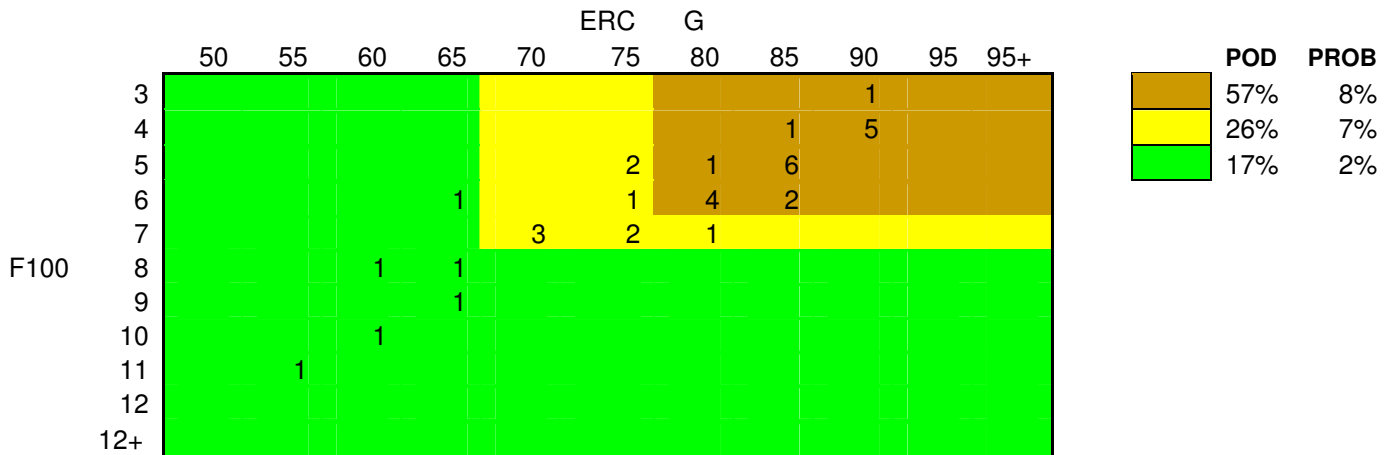
Large Fire Size for EB08: **300 acres**

Months used for analysis: **June - September**

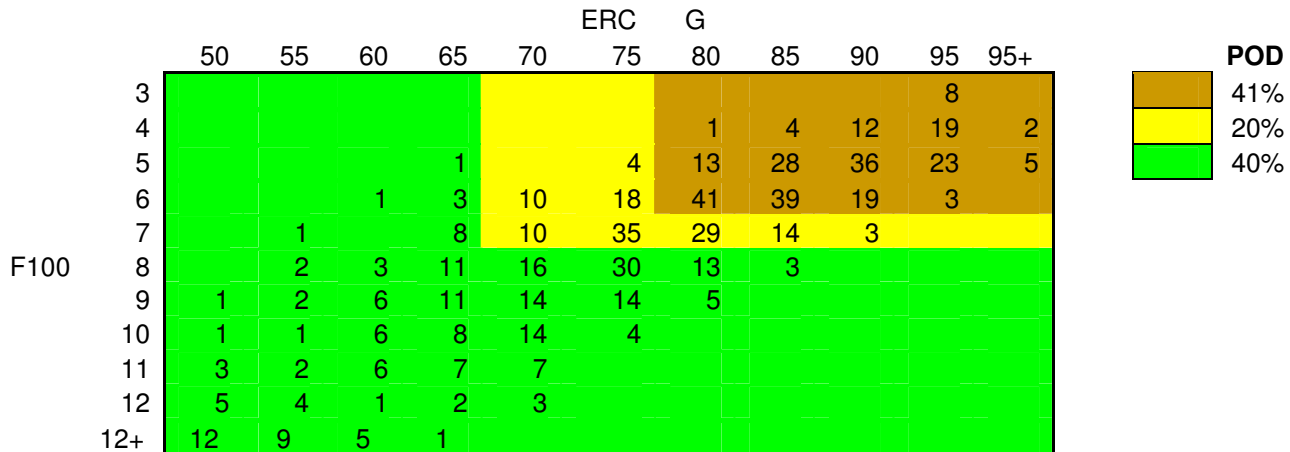
Years used for analysis: **2000-2007**



EB08 “Large” Fire Day Matrix:



EB08 “All” Fire Day Matrix:



PSA EB09 – Northeast Uinta Mountains

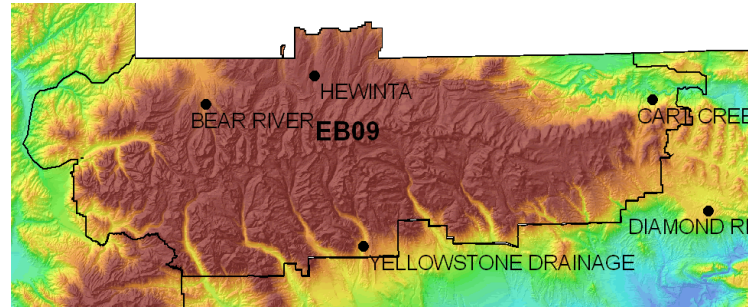
This area represents the northwest portion of the Wasatch Cache and Ashley NF.

Key RAWs Name

Bear River
Hewinta

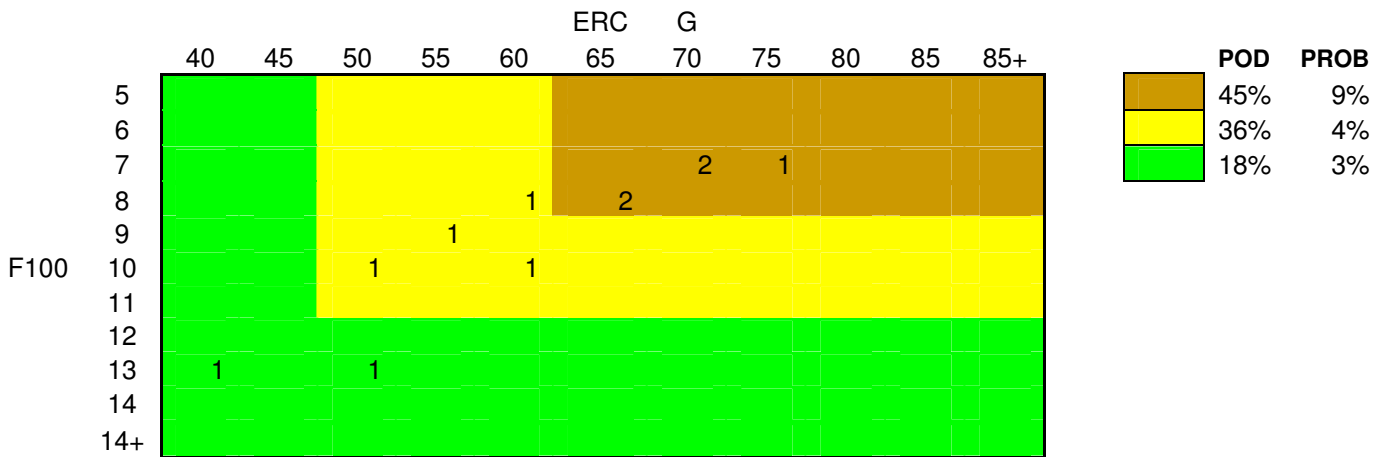
WIMS ID

420703
420705

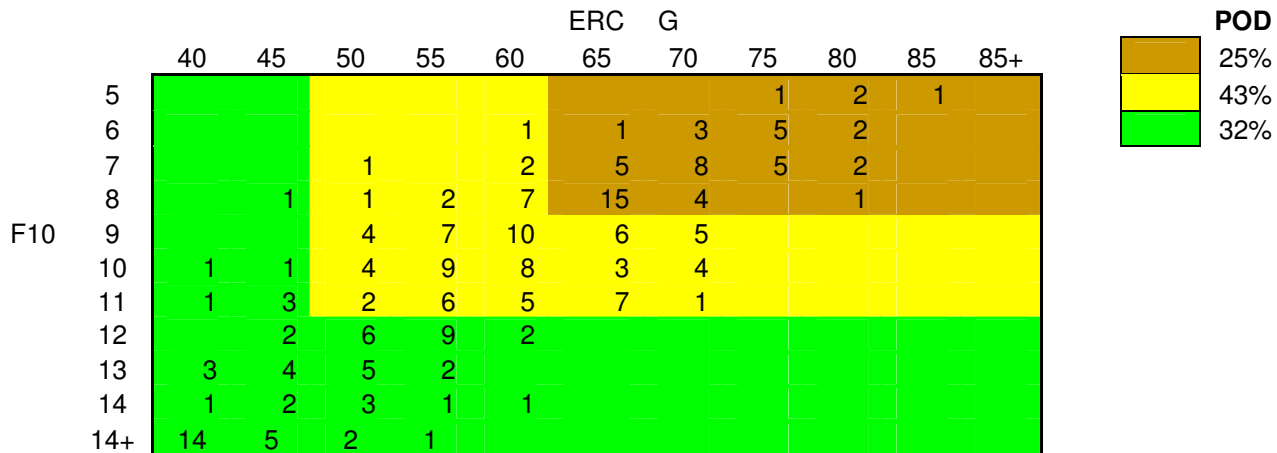


Large Fire Size for EB09: **150 acres**
Months used for analysis: **June - September**
Years used for analysis: **2000-2007**

EB09 “Large” Fire Day Matrix:



EB09 “All” Fire Day Matrix:



PSA EB10 – Uinta Basin

This area represents the Uinta Basin including Vernal BLM lands and northern portions of the Uintah-Ouray BIA lands.

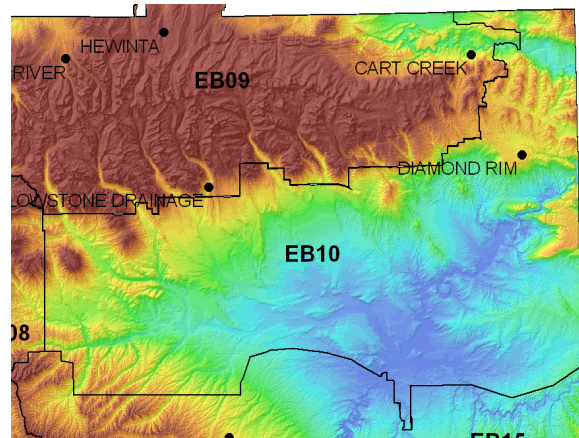
Key RAWs Name

McCook
Yellowstone
Five Mile

WIMS ID

420805
421301
421304



Large Fire Size for EB10: **50 acres**
Months used for analysis: **June - September**
Years used for analysis: **2000-2007**



EB10 “Large” Fire Day Matrix:

		ERC G											POD	PROB	
		50	55	60	65	70	75	80	85	90	95	100	100+		
F100	<3													41%	14%
	3									1		2		47%	13%
	4					1				4	1	1	1	12%	3%
	5					1	2		2	2					
	6					3	2	1							
	7					1	1	2	2						
	8	2				1									
	9														
	10	1													
	11														
	12														
	12+														

EB10 “All” Fire Day Matrix:

		ERC G											POD						
		50	55	60	65	70	75	80	85	90	95	100	100+		30%				
F100	<3													1		36%			
	3									2	1	7	7	5					
	4				2					2	4	13	15	6	2				
	5				1	2	4	7	14	13	10	1							
	6				1	5	16	11	15	13	3								
	7	1			2	5	13	12	8	4									
	8	2			4	6	8	6	1	1									
	9	1	3	10			6	8	2										
	10	3	4			4	7	5											
	11	2		3	3	2	1												
	12	2	2	1	2														
	12+	8	2	3	1	1													

PSA EB11– Southwest Utah

This area represents the Utah's southwest deserts comprised of mostly BLM lands, except a western portion of the Dixie NF.

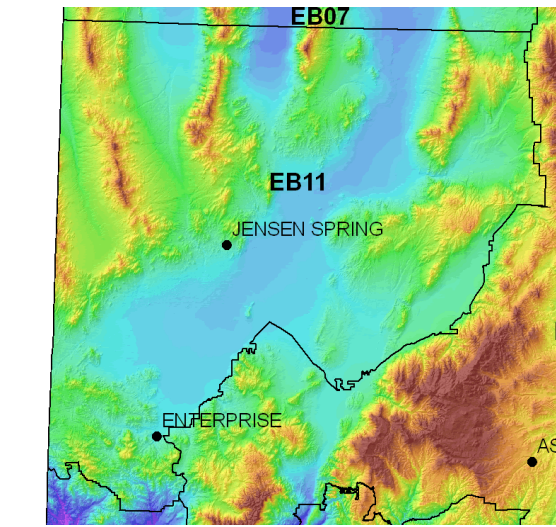
Key RAWS Name

Jensen Spring
Enterprise

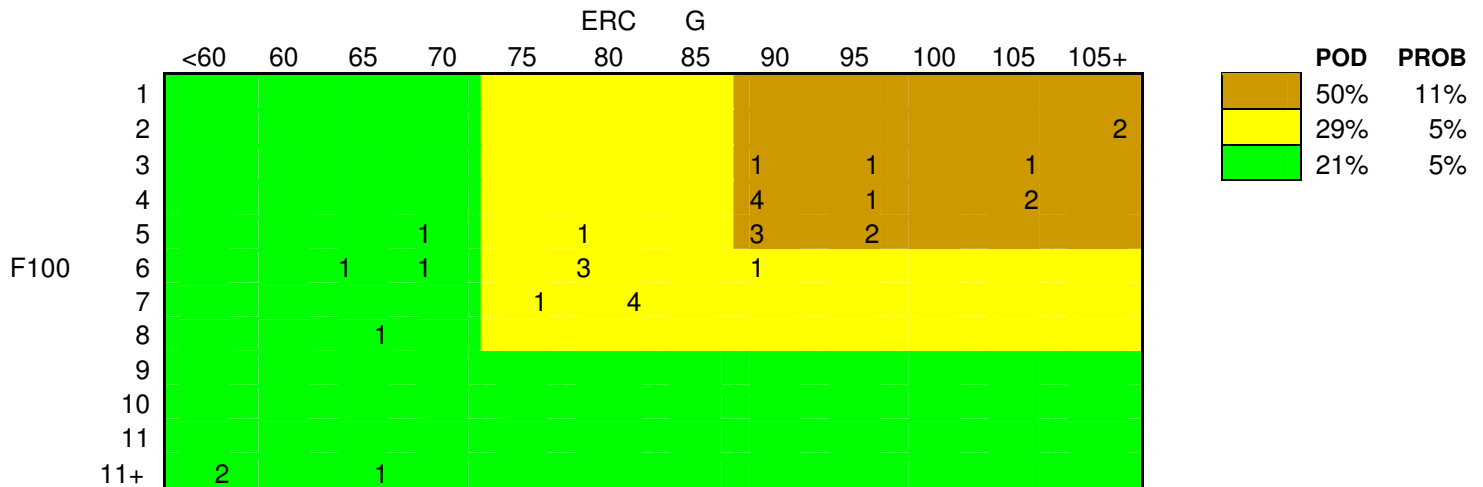
WIMS ID

422502
422803

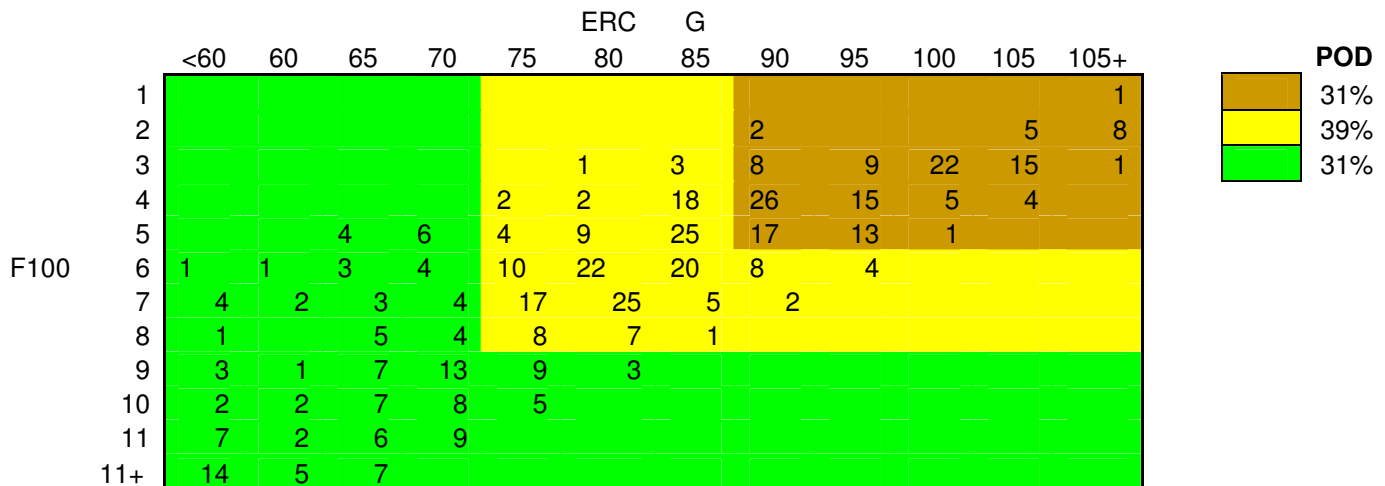
Large Fire Size for EB11: **1000 acres**
Months used for analysis: **May - August**
Years used for analysis: **2000-2007**



EB11 “Large” Fire Day Matrix:



EB11 “All” Fire Day Matrix:



PSA EB12– South Central Utah Mountains

This area represents the Utah's south central mountains, including the Fishlake and Dixie National Forests, Cedar City BLM, and Bryce Canyon NP.

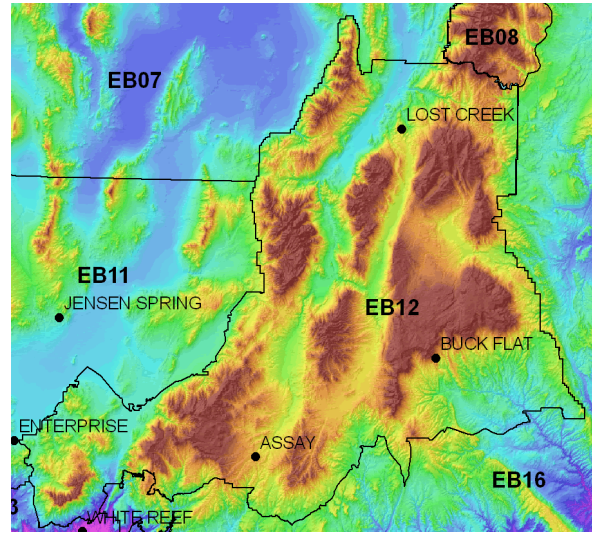
Key RAWS Name

Assay Bench
Buck Flat
Lost Creek

WIMS ID

422604
422606
421905

Large Fire Size for EB12: **300 acres**
Months used for analysis: **May - August**
Years used for analysis: **2000-2007**



EB12 “Large” Fire Day Matrix:

		ERC G													
		<60	60	65	70	75	80	85	90	95	100	105	105+	POD	PROB
F100	2													51%	8%
	3							1	1	1	2			22%	5%
	4					1	1	1	2					27%	5%
	5					2	1	2							
	6				1	1	1		1						
	7			2	1	1	2								
	8	1		1											
	9		1	3	1										
	10		2	1	1										
	11	2													
	11+	3													

EB12 “All” Fire Day Matrix:

		ERC G													
		<60	60	65	70	75	80	85	90	95	100	105	105+	POD	
F100	2										3	9	3	39%	
	3							5	5	12	10	2		26%	
	4			1		5	6	19	21	7	3			35%	
	5		1	2	10	14	25	16	10	5					
	6	1	3	11	20	16	21	9	6						
	7	3	8	15	19	11	8	3	2						
	8	5	10	18	13	16	8	1							
	9	14	18	21	15	3	1								
	10	12	16	17	5	2									
	11	21	17	6	2										
	11+	60	7	1											

PSA EB13– Mojave Deserts

This area represents the Mojave deserts of southwest Utah and northwest Arizona. It is comprised of mostly Cedar City BLM lands.

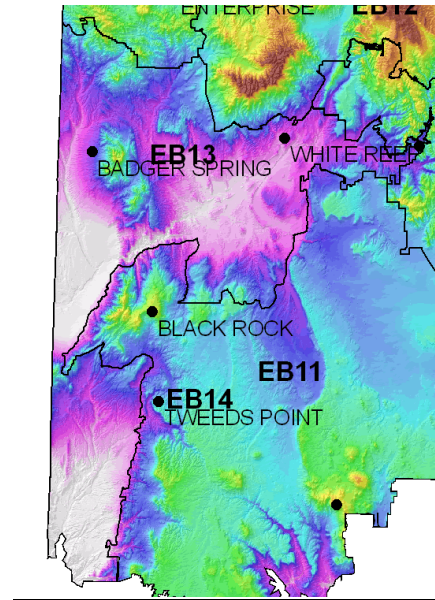
Key RAWs Name

White Reef
Badger Springs
Zion Canyon

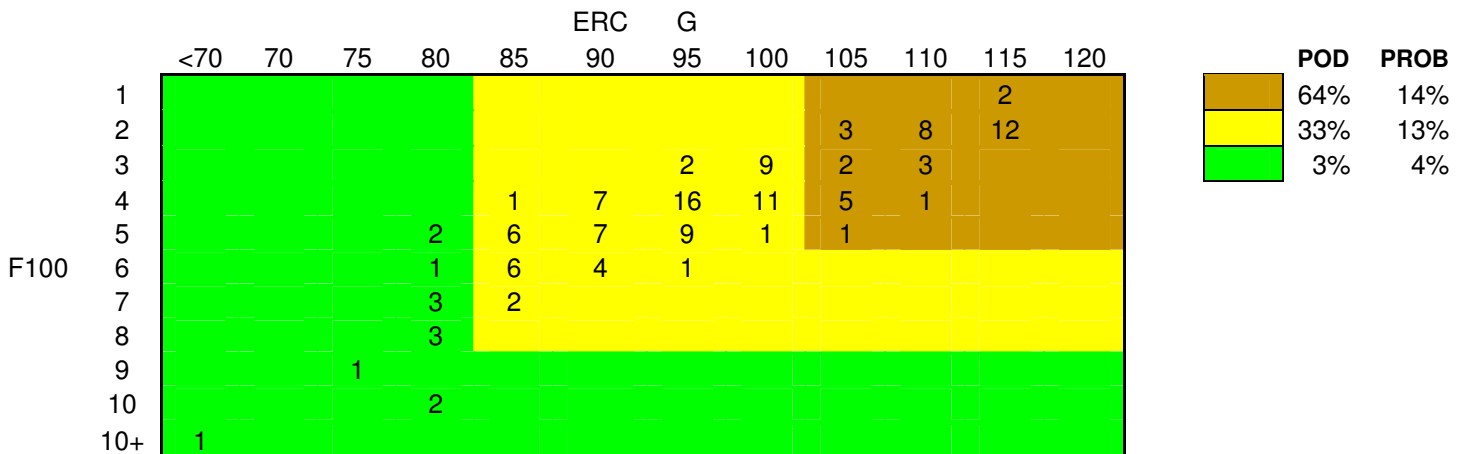
WIMS ID

422805
422806
422808

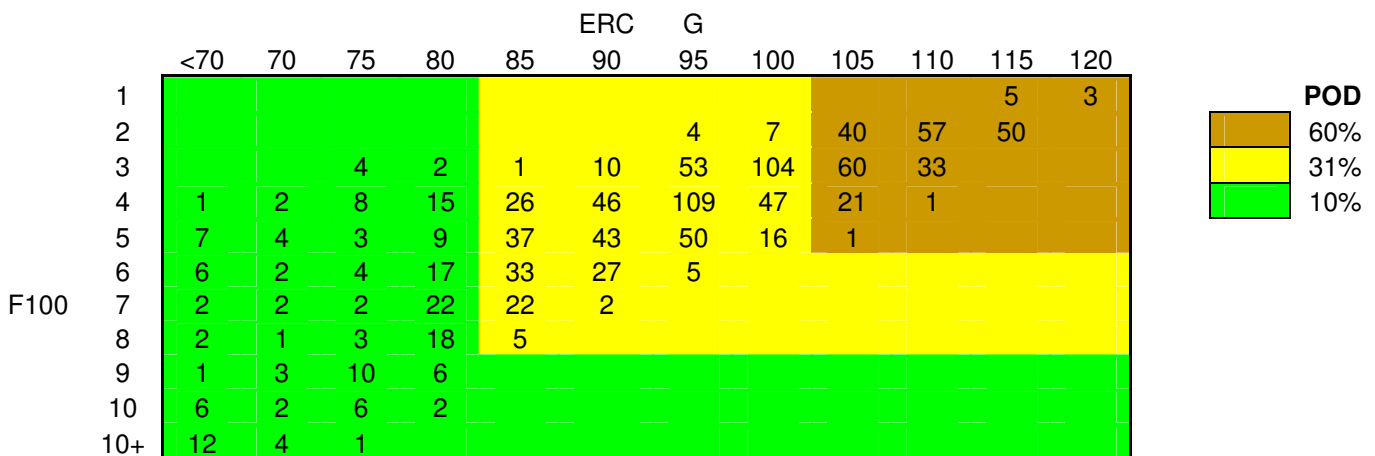
Large Fire Size for EB13: **5000 acres**
Months used for analysis: **May - August**
Years used for analysis: **2000-2007**



EB13 “Large” Fire Day Matrix:



EB13 “All” Fire Day Matrix:



PSA EB14 – Arizona Strip

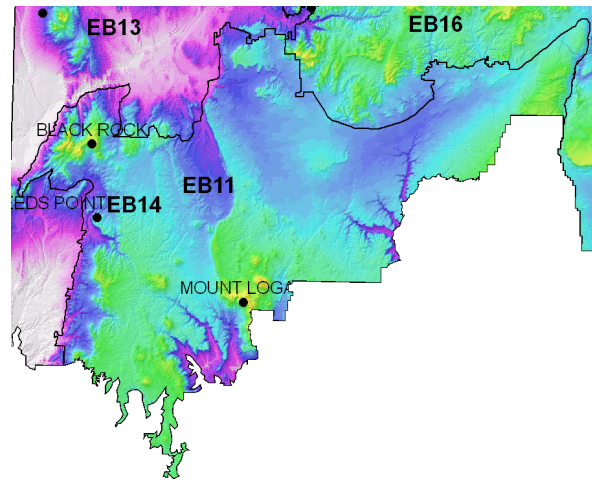
This area is comprised mostly of Arizona Strip BLM land.

Key RAWS Name

Tweeds Point
Mt Logan
Blackrock

WIMS ID

20109
20107
20114



EB14 “Large” Fire Day Matrix:

		ERC G											POD	PROB
		60	65	70	75	80	85	90	95	100	105	110		
F100	1												46%	21%
	2										2	1	37%	10%
	3									1	1		17%	6%
	4						1	1	2	2	2			
	5					1	1		1	3				
	6						4	1	1	1				
	7			1			1							
	8		1		4	1								
	9													
	10													
	11													
	11+													

EB14 “All” Fire Day Matrix:

		ERC G											POD	
		60	65	70	75	80	85	90	95	100	105	110		
F100	1												28%	
	2										2	2	45%	
	3									7	8	4	26%	
	4					1	4	3	9	12	6	2		
	5					2	11	5	8	11	3			
	6			3	3	6	15	13	8	1				
	7	1		2	6	20	12	4	2					
	8		2	3	9	9	9	1						
	9		1	6	4	7	5							
	10	3		3	6	0	1							
	11	3	3	3		2								
	11+	11	6	3										

PSA EB15 – Bookcliffs

This area represents the Bookcliffs mountains in eastern Utah, including the Uintah – Ouray BIA lands, and Uintah Basin BLM land.

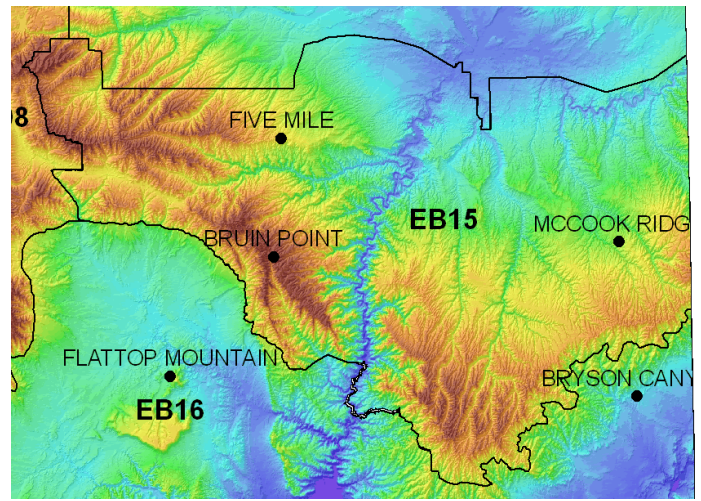
Key RAWs Name

North Long Point
McCook Ridge

WIMS ID

422710
421405

Large Fire Size for EB14: **200 acres**
Months used for analysis: **May - August**
Years used for analysis: **2000-2007**



EB15 “Large” Fire Day Matrix:

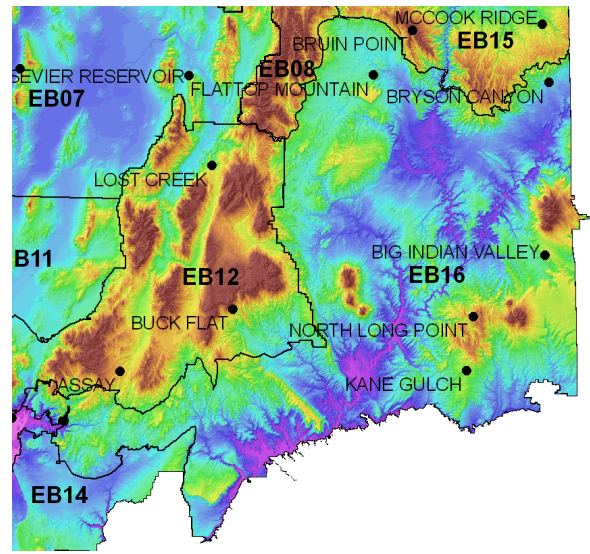
		ERC G											POD	PROB
		60	65	70	75	80	85	90	95	100	105	105+		
F100	2												59%	12%
	3									2	2		32%	6%
	4							3	2		1		24%	3%
	5		1		1	2	2	3	1					
	6			1			3		1					
	7			1	3			2						
	8		1		1									
	9	1												
	10		1											
	11	4												

EB15 “All” Fire Day Matrix:

		ERC G											POD	
		60	65	70	75	80	85	90	95	100	105	105+		
F100	2										5	1	27%	
	3						1	2	10	11	9		30%	
	4		2		3	7	7	14	17	6	1		43%	
	5	1	2	4	6	17	21	24	3	5				
	6	2	2	12	20	12	18	9	4					
	7	9	7	14	15	20	11	5						
	8	12	10	11	10	15	4							
	9	22	11	13	3									
	10	22	12	6										
	11	110	16	3										

PSA EB16– Southeast Utah Mountains and Bookcliffs

This area represents southeast Utah. It is comprised of the southeast Manti-La Sal NF as well as Moab District BLM land. Canyonlands and Arches National Parks are found in this PSA.



Key RAWs Name

WIMS ID

Big Indian
Bryson Ridge
Flat Top Mtn
Kane Gulch

422711
422102
422002
422712

Large Fire Size for EB14: **200 acres**
Months used for analysis: **May - August**
Years used for analysis: **2000-2007**

EB16 “Large” Fire Day Matrix:

		ERC													
		<55	55	60	65	70	75	80	85	90	95	100	100+	POD	PROB
F100	2													63%	14%
	3									1	3			30%	6%
	4									3	2	2		7%	5%
	5							1	2	1					
	6											1			
	7					1		1	1						
	8					1									
	9														
	10														
	11														
	11+	2													

EB16 “All” Fire Day Matrix:

		ERC													
		<55	55	60	65	70	75	80	85	90	95	100	100+	POD	
F100	2													39%	
	3									2	14	17	5	47%	
	4							5	3	20	23	11	1	14%	
	5						3	9	9	15	6	1			
	6					1	7	19	14	11	2				
	7	1				7	9	12	8	2					
	8				2	4	3	12	1						
	9			2	2	8		4							
	10	1		3	1	4	2								
	11	1		2	1										
	11+	3	1	4											

